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RECORDING AND REPRODUCING DEVCE
[Kiroku saisei sochi]

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Claims

[1] Recording and reproducing device is equipped with (1) a recording/playback means that converts optical data obtained from an objective lens formed in a device body into image data and records/plays back said image data, (2) display means having a display screen displaying the image data recorded or reproduced by said recording/playback means, and (3) display control means that controls the operational data of said recording playback device and displays on the display screen of said display means; and

provides the first control operation that divides said image data and operational data and displays on said display screen of the display means using said display control means, and the second control operation that displays only said image data on the display screen of the display means.

[2] Recording and reproducing device is equipped with (1) a main recording/playback means that converts optical data obtained from an objective lens formed in a device body into motion image data and records/plays back said motion image data, (2) secondary recording/playback means that records/plays back still image data, (3) display means having a display screen displaying the motion image data recorded or reproduced by said main recording/playback means and still image data recorded or reproduced by said secondary recording/playback means, and (4) display control means that controls

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the operational data of said recording playback device and displays on the display screen of said display means; and

provides the first control operation that divides said image data and operational data and displays on said display screen of the display means using said display control means, and the second control operation that displays only said image data on the display screen of the display means.

[3] In Claim 2, said display control means selects at least two types of data selected from motion image data, still image data, and data regarding to recording/playback device operation, and displays on the display screen by dividing said data.

[4] In Claim 2 or 3, said display control means controls multiple still image data recorded by the secondary recording/playback means on the display screen of the display means.

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[5] In Claim 2 or 3, the display control means controls to integrate the recording image data and still image data recorded to the secondary recording/playback means and displays the composed data on the display screen of the display means.

[6] In Claim 1 or 2, the display control means rotates the inputting image data so that the lower portion of the image can be displayed on the longitudinal side of the display screen of the display means.

[7] In Claim 1 - Claim 6, the display control means expands and compresses the inputting image data before displaying the data on the display screen.

[8] Recording and reproducing device is equipped with (1) a main recording/playback means that converts optical data obtained from an objective lens formed in a device body into motion image data and records/plays back said motion image data, (2) secondary recording/playback means that records/plays back the motion image as still image data, (3) display means having a display screen capable of displaying either or both of motion image data recorded or reproduced by said main recording/playback means and still image data recorded or reproduced by said secondary recording/playback means, and (4) display control means that controls the display means when displaying either or both of motion image data recorded or reproduced by said main recording/playback means and still image data recorded or reproduced by said secondary recording/playback means on the display screen.

[9] Recording and reproducing device is equipped with (1) a main /26 recording/playback means that converts optical data obtained from an objective lens formed in a device body into motion image data and records/plays back said motion image data, (2) secondary recording/playback means that records/plays back the motion image played back by said main recording/playback means as still image data, (3) display means having a display screen capable of displaying

either or both of motion image data recorded or reproduced by said main recording/playback means and still image data recorded or reproduced by said secondary recording/playback means, and (4) display control means that controls the display means when displaying either or both of motion image data recorded or reproduced by said main recording/playback means and still image data recorded or reproduced by said secondary recording/playback means on the display screen.

[10] In Claim 8 or 9, said control means intermittently records inputted motion image as multiple still image data using a secondary recording/playback means and controls the multiple still image data on the display screen when said secondary recording/playback means plays back recorded multiple still image data and display onto the display means.

[11] In Claim 10, said control means arranges the intermittent recording time as adjustable time when intermittently recording the inputted motion image data as still image data using the secondary recording/playback means.

[12] In Claim 8, 10, or 11, said control means initiates still image recording simultaneous to starting the operation of recording motion image to the main recording/playback means.

[Industrial field]

This invention pertains to a recording/playback device containing a monitor screen.

[Conventional technology]

Various types of recording/playback devices are available for recording/reproducing image/voice data onto recording medium and memory element (e.g., videotape, optical disk, memory IC, etc.) Particularly, considerable advancement was made on the devices equipped with a 3" - 5" liquid color display (from here, the term 'LCD' is used).

The following explains the conventional recording-reproducing device.

Part (a) of Fig. 10 is a diagram of conventional recording-reproducing device, and Part (b) of the figure shows the diagram of and LCD image display example displayed on a monitor. In Fig. 10, item **101** designates a device body containing a recording medium (not shown in the figure) wherein optical data sent from an objective lens **102** is converted to image data and recorded to the recording medium. Item **103** designates a viewfinder, an approx. 1" screen, reconverts the image data recorded on a recording medium into optical data. Item **104** designates a monitor having an LCD having approx. 4:3 aspect ratio, being held at the center of the side of device body **101** by a rotation system attached to the horizontal side of the LCD screen,

allowing the screen to bend toward the side surface of the device body **101** and folded by rotating the rotation system. LCD 104a of the monitor **104** reconverts the data recorded onto, or played back from a recording medium into optical data in the same manner as the viewfinder **103**. Furthermore, to inform a user, various operational data designating the status of the recording/playback device are /2 displayed, being overlaid with the optical data in a form of characters or shapes. To operate a device, a user must be informed of some operational data of the recording/playback device. Examples of such data are operational mode data (recording: REC, playback: PLAY, etc., message, 'Start taking images,' shown in Fig. 10), view data of the objective lens **102** (Wide: W, Tele: T), recording medium data (Oh 00m 00s, 0th page, etc.), battery power data (Full: F, Empty: E, etc.; battery picture is used in Figure 10), special camera data (fading, etc.)

The following explains the conventional recording/playback device configured as described above.

A user holds the device body **101** with one hand (right hand in Fig. 10), aligns the objective lens **102** to the object, and records the image. The recording content can be confirmed by the viewfinder **103** and monitor **104**. Also, when playing back the recorded data, viewfinder **103** and monitor **104** can be used.

As another type of conventional recording/playback device, by installing a first rotational shaft formed at the horizontal side of

the monitor and second rotational shaft diagonally crossing to the shaft, the monitor screen can be rotated toward the direction where objective lens is directed. In this case, the device commonly detects the rotational angle of the second rotational shaft and inversely rotates the monitor screen in the upward/downward directions according to the rotational angle. With this design, the image data is observable from the object (i.e., 'self-image capturing'), in addition to the operational data of the recording/playback device from the object side.

However, with the conventional recording/playback device, since the operational data of the device is overlaid to the image data recorded onto the device and reproduced image data monitor **104**, which is relatively a small screen, the image in the area where the operational data is superposed is hard to verify. In addition, data associated with the operation of the recording/playback device also overlays with the image and is hard to observe. Particularly, when the screen image must be viewed from the object side, as the monitor is observed away from the screen, viewing the operational data on the recording/playback device is fairly difficult. /3

Since the superposed area becomes greater as the operational data of the recording/playback device increases, said problems are particularly serious for high capacity recording/playback device providing many device-operation data.

This invention solves those problems. The purpose of this invention is to provide a recording/playback device that can display device-operation data and object image in an easily observable format on the LCD screen mounted on a compact device in addition to the capability of displaying the reproduced image over the entire LCD screen surface in the playback mode.

Also, with the conventional recording/playback device configuration, as recording data and playback image data are displayed as motion image on the monitor **104**, the recording image data cannot be verified as a still image on the monitor. Furthermore, image data reproduced on the monitor by the device is fairly hard to verify as it is not a still image.

The method based on this invention solves the problems described above by providing a recording/playback device that can display a still image of image data recorded on the device, while allowing the image data played back by the recording/playback device to be observed as a still image.

[Operation]

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To achieve the purpose as described above, the recording/playback device based on this invention provides (a) the first control function that displays the image data and device-operation data on the same display screen by dividing images using a display control means and (b) second control function that only displays the image data over the entire display screen.

With this configuration, operational data of the recording/playback device is not overlaid on the image data displayed on the screen, as each data is separately shown on the screen for easier observation. Also, the method based on this invention can display the motion image data using the entire monitor screen if necessary.

Furthermore, the recording and reproducing device based on this invention is equipped with (1) a main recording/playback means that converts optical data obtained from an objective lens formed in a device body into motion image data and records/plays back said motion image data, (2) secondary recording/playback means that records/plays back still image data, (3) display means having a display screen displaying the motion image data recorded or reproduced by said main recording/playback means and still image data recorded or reproduced by said secondary recording/playback means, and (4) display control means that controls the operational data of said recording playback device and displays on the display screen of said display means.

With this configuration, the image data (motion image data) recorded to a recording/playback device can be confirmed as a still image of selected time. Also, the image data (motion image data) reproduced by the recording/playback device can be confirmed on the display screen as a still image selected from the motion image data according to the chosen moment.

That is, with the method described in Claim 1 of this invention, the recording/playback device is equipped with (1) a recording/playback means that converts optical data obtained from an objective lens formed in a device body into image data and records/plays back said image data, (2) display means having a display screen displaying the image data recorded or reproduced by said recording/playback means, and (3) display control means that controls the operational data of said recording playback device and displays on the display screen of said display means; and provides the first control operation that divides said image data and operational data and displays on said display screen of the display means using said display control means, and the second control operation that only displays said image data on the display screen of the display means. With this method, as the recording or playback motion image data and recording/playback device data can be simultaneously and independently displayed in the different areas of the same screen, the device-information data does not need to be overlaid with the displaying image, while motion image data can be displayed on the almost entire screen if desired. Therefore, motion image data and device-operation data can be easily discriminated. /5

Also, with the second claim of this invention, the recording and reproducing device is equipped with (1) a main recording/playback means that converts optical data obtained from an objective lens formed in a device body into motion image data and records/plays back

said motion image data, (2) secondary recording/playback means that records/plays back still image data, (3) display means having a display screen displaying the motion image data recorded or reproduced by said main recording/playback means and still image data recorded or reproduced by said secondary recording/playback means, and (4) display control means that controls the operational data of said recording playback device and displays on the display screen of said display means; and provides the first control operation that divides said image data and operational data and displays on said display screen of the display means using said display control means, and the second control operation that displays only said image data on the display screen of the display means.

The second claim described above enables full-screen display of still image in addition to the capacity of full screen motion image display explained in the first claim. Also, the recording or playback display image data and recording/playback device data can be simultaneously and independently displayed in the different areas of the screen, the device-information data does not need to be overlaid with the displaying image. Therefore, motion image data and device-operation data can be easily discriminated. /6

With the third claim of this invention, in addition to the configuration described in the second claim, said display control means can display at least two types of data selected from motion image data, still image data, and device-operation data, and displays

the selected data in the separate sections of the display screen. Furthermore, with the fourth claim of this invention, in addition to the configuration described in the second and third claims, said display control means controls multiple still image data recorded by the secondary recording/playback means on the display screen of the display means. With those configuration, motion image and still images selected from the specific section of motion image can be separately displayed on the same display screen. Also, motion image and still images overlaid with the motion image (e.g., title, frame, etc.) can be separately displayed on the same screen. Therefore, those device configurations can eliminate the problem experienced with the conventional method (i.e., current motion image cannot be observed while a still image is displayed on the entire screen.)

With the fifth claim of this invention, in addition to the second and third claims, the display control means controls the display process to compose the recording image and still image data recorded to the secondary recording/playback means and displays the composed data on the display screen of the display means, allowing the recording image signal and composed image data to be separately displayed on the same screen, thereby preventing the problem on observing the currently recording motion image.

With the sixth claim of this invention, in addition to the first and second claims of this invention, the display control means rotates the inputting image data so that the lower portion of the

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image can be displayed on the longitudinal side of the display screen of the display means. With the seventh claim of this invention, in addition to the first - sixth claims of this invention, the display control means expands and compresses the inputting image data before displaying the data on the display screen. Therefore, since the display control means controls the inputted image data (regardless of the motion or still image) by applying rotation, expansion, and contraction to the display image, the image can be displayed on the entire display screen having a certain aspect ratio. This technique is particularly useful when the playback image is enlarged on a wide display screen for many audiences.

With the eighth claim of this invention, recording and reproducing device is equipped with (1) a main recording/playback means that converts optical data obtained from an objective lens formed in a device body into motion image data and records/plays back said motion image data, (2) secondary recording/playback means that records/plays back the motion image as still image data, (3) display means having a display screen capable of displaying either or both of motion image data recorded or reproduced by said main recording/playback means and still image data recorded or reproduced by said secondary recording/playback means, and (4) display control means that controls the display means when displaying either or both of motion image data recorded or reproduced by said main recording/playback means and still image data recorded or reproduced

by said secondary recording/playback means on the display screen. Therefore, when optical data is recorded as motion image data by a main recording/playback means, the recording motion image can be also recorded and displayed as selected still images using a secondary recording/playback means.

With the ninth claim of this invention, recording and reproducing device is equipped with (1) a main recording/playback means that converts optical data obtained from an objective lens formed in a device body into motion image data and records/plays back /8 said motion image data, (2) secondary recording/playback means that records/plays back the motion image played back by said main recording/playback means as still image data, (3) display means having a display screen capable of displaying either or both of motion image data recorded or reproduced by said main recording/playback means and still image data recorded or reproduced by said secondary recording/playback means, and (4) display control means that controls the display means when displaying either or both of motion image data recorded or reproduced by said main recording/playback means and still image data recorded or reproduced by said secondary recording/playback means on the display screen. With this configuration, when reproducing the motion image data recorded by the main recording/playback means, secondary recording/playback means can display the recorded image as still

images showing certain moments of the recorded motion image, thereby allowing the user to confirm the content of the motion image.

With the tenth claim of this invention, in addition to the eighth or ninth claim of this invention, said control means intermittently records inputted motion image as multiple still image data using a secondary recording/playback means and controls the multiple still image data on the display screen when said secondary recording/playback means plays back recorded multiple still image data and display onto the display means. This configuration allows the secondary recording/playback means to intermittently select certain section of motion image data recorded/reproduced by the main recording/playback means so as to intermittently record/reproduce multiple still image data, and display said multiple still images on one screen for a user to verify the recorded motion image content.

With the eleventh claim of this invention, in addition to the tenth claim, said control means arranges the intermittent recording time as adjustable time when intermittently recording the inputted motion image data as still image data using the secondary recording/playback means. With this configuration, when the secondary recording/playback means intermittently selects certain section of motion image data recorded/reproduced by the main recording/playback means and records/reproduces the selected data as multiple still image data, such intermittent selection time can be made modifiable according to the content of the motion image, thereby

allowing the appropriately selected multiple still images to be displayed on one screen for a user to verify the recorded motion image content.

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With the twelfth claim of this invention, in addition to the eighth, tenth, and eleventh claims of this invention, said control means initiates still image recording simultaneous to starting the operation of recording motion image to the main recording/playback means. With this configuration, since a user does not need to concern both the motion and still image processing, the operation can be simpler.

[Simple Explanation of Figures]

Figure 1 is a diagram showing the recording/playback device used in Operational example 1. Figure 2 is a diagram of LCD screen display of the monitor of the device shown in Fig. 1. Figure 3 is a diagram showing the device configuration of the system shown in Fig. 1. Figure 4 is a diagram showing the playback process of the recording/playback device used in Operational example 1. Figure 5 is a diagram showing the recording/playback device used in Operational example 2. Figure 6 is a diagram of LCD screen display example of the monitor of the device shown in Fig. 5. Figure 7 is a diagram of another LCD screen display example of the monitor of the device shown in Fig. 5. Figure 8 is a diagram of another LCD screen display example of the monitor of the device shown in Fig. 5. Figure 9 is a diagram showing the device configuration of the system used in the

third operational example. Part (a) of Fig. 10 is a diagram showing the device configuration of a conventional system; Part (b) of Fig. 10 is a diagram showing an example of LCD screen image displayed on the monitor of the same system.

[Operational examples]

The following explains the operational examples of this invention while referring to figures:

Operational example 1:

Figure 1 is a diagram showing the recording/playback device used in Operational example 1. In the figure, items **1**, **2** and **3** respectively designate a device body, objective lens, and viewfinder, which are equivalent to those shown in Fig. 10. Item **4** designates a monitor (display means) containing an LCD screen **4a** having a wide aspect (aspect ratio = 16:9), being held at the side surface of the main body **1** by the rotational system (not shown in the figure) attached near the longitudinal side of the LCD screen **4a** so as to allow the screen to be bent and folded over the side surface of the device body **1** by rotating the rotation system. LCD screen **4a** reconverts the data recorded onto, or played back from a recording medium into optical data in the same manner as the viewfinder **3**. Furthermore, various operational data of the recording/playback device are displayed in a form of characters and shapes over the optical data to inform the user. The difference of display method between the conventional device and this device is that the image

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data recorded onto a recording medium is displayed at the upper area of the LCD screen **4a**, and various operational data of the device is displayed at the lower area of the LCD screen **4a** in a form of characters and shapes (e.g., message of 'Start recording').

The following explains the operation of the recording/playback device configured as described above while referring to figures:

A user holds the device body **1** with one hand, aligns the objective lens **2** to the object, and records the image. The recording content can be confirmed by the viewfinder **3** and monitor **4**. To play back the recorded data, viewfinder **3** and monitor **4** can be used.

Figure 2 is a diagram showing a display example of monitor screen **4a** of the monitor **4**. In the figure, the monitor screen **4a** is divided into upper and lower sections, wherein recording image data is displayed in the upper section **4b**, and various operational data of the device are displayed on the lower section **4b** in the form of characters and figures.

The following explains the configuration of the recording/playback device used in this example. Figure 3 is a diagram showing the configuration of the device used in this example. In the figure, item **11** designates a camera that converts the optical data sent to the objective lens **2** shown in Fig. 1 into image data and outputs the image data to a medium recording/playback part **12** which is a recording/playback means that records/reproduces image data as a motion image. Item **17** designates a switch that selects the image

data inputted into the monitor display control part **13** from the I/O image data of the medium recording/playback part **12** according to the control signal of the device control part **15** (described later). Item **15** designates a device control part that supplies respective control signals to the camera **11**, medium recording/playback part **12**, monitor display control part **13**, and switch **17** corresponding to the status of operational part **16** set by a user and also inputs the respective status data. Item **14** designates a display signal generation part forming a display control means with the monitor display control part **13**, being connected to the monitor display control part **13** to output the display signal (e.g., mode display such as 'REC', battery power status 'F.---E', etc.) corresponding to the status signal of the recording/playback device being inputted to the monitor display control part **13** from the device control part **15**. Monitor display control part **13** displays a display signal from the display signal generation part **14** to the LCD screen **4a** of the monitor part **4**.

The following explains the practical operation of the recording/playback device configured as described above while referring to Figs. 1 - 3.

When a user manipulates the operation part **16** to set the device to recording mode, the operation data from the operation part **16** is inputted to the device control part **15**, which then outputs control signals of the recording mode to the camera **11**, medium recording/playback part **12**, monitor display control part **13**, and

switch **17**. As a result, the camera **11** converts the optical data entered from the objective lens **2** into image data and outputs the data to the medium recording/playback part **12** and switch **17**. In some cases, control signals for changing the vision field and exposure of the objective lens **2** may be outputted to the camera **11** from the device control part **15**. The medium recording/playback part **12** /12 records the image data to the recording medium. The switch **17** is appropriately switched by the control signal sent from the device control part **15** so that the output from the camera **11** can be inputted to the monitor display control part **13**. With this camera mode (i.e., recording mode), the monitor display control part **13** displays the inputted image signal to the upper side of the LCD screen **4a** of the monitor part **4** as shown in Fig. 2, while the operational data of the recording/playback device described above is converted into display signals by the display signal generator **14** and displayed on the lower side of the LCD screen **4a**. Therefore, when the device is set to recording mode, the device control part displays a recording image in the upper area **4b** of the LCD screen **4a** of the monitor **4** and operational data of the device body **1** in the lower part **4c**.

Next, when a user set the operation part **16** to playback mode, the operation data sent from the operation part **16** is inputted to the device control part **15**, which then inputs playback mode control signals to the camera **11**, medium recording/playback part **12**, monitor display control part **13**, and switch **17**. As a result, the operation

of camera **11** is terminated. The medium recording/playback part **12** plays back the image data recorded onto the recording medium and outputs the played back data to the switch **17**. The switch **17** is switched by the control signal transmitted from the device control part **15** so that the monitor display control part **13** can receive the output from the medium recording/playback part **12**. During the playback mode, as the device control part **15** controls the monitor display control part **13** to terminate the display signal inputted from the display signal generation part **14**, the monitor display control part **13** displays the inputted image signal to the entire screen of the LCD screen **4a** as shown in Fig. 4. In this case, the monitor display control part **13** elongates and rotates the inputted image data so that the longer side of the LCD screen **4a** can be adjusted to the upper or lower end of the reproduced image using the control signal sent from the operational part **16** and displays the prepared image onto the LCD screen **4a**. Since this procedure can maximally utilize the LCD screen **4a** of the monitor **4** for displaying the reproduced image, the display screen can be effectively enlarged when viewed by many viewers. In this case, as the monitor can be placed on a table in such a way that the side surface of the device body, which is opposite from the monitor-attached side, can be arranged as the bottom surface. As a result, the recording/playback device can be stably positioned. /13

Although the monitor display control part **13** completely shut off the display signal sent from the display signal generation part **14** during the playback mode in the example described above, the method based on this invention is not limited to this configuration. For example, the display signal may be specifically controlled to only display the operational-mode display (PLAY, STOP, etc.) and recording medium data (Oh 00m 00s). Also, the display image can be overlaid with the display image data (playback image) displayed over the entire surface of LCD screen **4a**, or image can be divided and displayed in a portion (e.g., lower side or right side of the screen) of the LCD screen **4a**.

With the example described above, the display device configuration can provide (1) the first control operation that displays said image data and operational data in the different section of said display screen of the display means using the display control means and (2) the second control operation that displays only the image data over the entire display screen of the display means. Therefore, recorded/reproduced image and operational data of recording/playback device can be simultaneously displayed without causing overlay of data on the screen.

Operational example 2:

The following explains the second operational example of this invention.

Figure 5 is a diagram of recording/playback device used in the second operational example. In the figure, item **22** designates a still image recording/playback part (secondary recording/playback device) to which image data that is identical to the data inputted to the medium recording/playback part **12** is inputted, while the image data consisting of several frames of still images is stored using the control signals of the device control part **25** according to the status of the operational part set by the user. The recording medium of 14 this device is a semiconductor memory having a lower capacity than the recording medium of the medium recording/playback part **12**. Item **23** designates a monitor display control part. As explained in Operational example 1, this monitor display control part is controlled by the control signal sent from the device control part **25** to divide/display still image data prepared by the still image display signal sent from the still image recording/playback part **22** in addition to the image data prepared by the motion image signals sent from the switch **17** and display data sent from the display signal generation part **24** corresponding to the operational data of the device sent from the device control part **25** on the LCD screen **4a** of the monitor **4**. Other parts are identical to those shown in Fig. 3 and not explained below.

The following explains the operation of the recording/playback device used in this example.

Still image recording/playback part **22** records the image signal sent from the camera **11**, creating frames of still image using the control signal outputted from the device control part **25** when the user sets the operational part **26**. Figure 6 is a diagram showing an example display on the monitor screen. In the figure, item **61** designates the area displaying a regular image data (motion image) sent from the camera **11**. Item **62** designates a part displaying still image data. By pressing the still image button (not shown in the figure) of the operational part **26**, still image data including the frame number (displayed at the left shoulder part) and confirmation item **63** are displayed at the center of the monitor. Again pressing the still image button of the operational part **26**, the still image recording/playback part **22** records the still image data **62**. By repeating this process, multiple still image data can be recorded. Figure 7 is a diagram showing the display screen example where multiple still images recorded in the still image recording/playback part **22** are displayed forming a multiple-section screen **72**. When the user operates the operational part **26**, the device control part **25** controls the still image recording/playback part **22** to reproduce multiple still images.

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As described in the example, by placing a still image recording/playback part **22**, still images can be selected from any portion of motion image and conveniently recorded. Particularly, as

multiple still images can be simultaneously displayed, desired still image can be effectively selected.

Some conventional recording/playback device, particularly video movie device, has a simple title creation function that records a piece of still pattern as a title page which can be attached the motion image before recording. This title function can be combined with the method based on this invention. Figure 8 is a diagram showing another example of LCD screen image of the monitor of a recording/playback device having a title function. The still image recording/playback part **22** may prerecord several kinds of patterns containing title characters and figures as shown in the lower part **82** of the monitor screen **4a** shown in Fig. 8, and selects/reproduces desired patterns. Then, the title page is integrated with the motion image **81** obtained through the camera and recorded as a single page. In this case, several title patterns can be recorded and simultaneously displayed on the same screen (4 kinds of patterns in Fig. 8), thereby allowing effortless selection of the pattern.

Although the monitor screen was facing toward the user in the example described above, as explained in the conventional method, the monitor screen may be directed in the same direction as the objective lens is directed, and rotated in the opposite upward/downward directions ('recording by facing against the camera'). Furthermore, although the example was limited to the situation when the lower side of the playback image was the longitudinal side of the monitor screen

during the playback process, this invention does not limit to this configuration and may display the captured image to the entire monitor screen without dividing the screen into sections.

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Also, although wide aspect ratio (16:9) was used as the monitor aspect ratio in the example described above, regular TV screen aspect ratio (4:3) may be used. In this case, regardless of the smaller area displaying the operational data of the recording/playback device compared with the wide screen, the same effectiveness (i.e., image and device data do not overlay) can be provided for the user to easily observe both data.

In addition, application of the method is not limited to an LCD screen used as the display screen in the example and may be any other applicable screen. Furthermore, the monitor may be color or monochrome.

Operational example 3:

The following explains the third operational example of this invention.

The diagram of the recording/playback device in this example is identical to the one shown in Fig. 1. Figure 9 is a diagram of the device used in this example. In the figure, item **17** designates a switch that selects the image data inputted into the monitor display control part **33** from the I/O image data of the medium recording/playback part **12** according to the control signal of the device control part **35**. Item **22** designates a still image

recording/playback part used as a secondary recording/playback means, to which image data identical to the data inputted to the medium recording/playback part **12** is inputted for recording multiple frames of still images based on the control signal sent from the device control part **35**. The recording medium is a semiconductor memory having a capacity lower than the recording medium of the medium recording/playback part **12**. Item **35** is a device control part that supplies respective control signals to the camera **11**, medium recording/playback part **12**, monitor display control part **13**, and switch **17** corresponding to the status of operational part **36** set by a user and also inputs the respective status data. With the operation of the operational part **36**, the device control part **35** controls the monitor display control part **33** by selecting one or both of switch signal **17** (input signal of the monitor display control part **33**) and signal from the still image recording/playback part **22**; then, outputs the signals to the monitor part **4**. Item **34** designates a display signal generation part which forms a display control means with the monitor display control part **33**, being connected to the monitor display control part **33** to output the display signal (e.g., mode display such as 'REC', battery power status 'F.---E', etc.) corresponding to the status signal of the recording/playback device being inputted to the monitor display control part **33** from the device control part **35**. Monitor display control part **33** displays the display signal from the display signal generation part **34** to the LCD

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screen **4a** of the monitor part **4**. The monitor display control part **33** displays the still image data prepared by the still image signal transmitted from the still image recording/playback part **22** to the LCD screen **4a** of the monitor **4** using the control signal sent from the device control part **35** along with the image data prepared from the motion image signal transmitted from the switch **17** and display data sent from the display signal generation part **34** corresponding to the device operational data sent from the device control part **35**. The rests of the configuration, which are identical to the device shown in Fig. 5 and explained in Operational example 2, are designated by the same keys as shown in Fig. 5 and not explained here.

The following describes the practical configuration of the recording/playback device structured as described above while referring to Figs. 1, 6, and 9.

When a user operates the operation part **36** to set the device to the camera preparation mode (i.e., recording preparation mode), the operational data sent from the operation part **36** is inputted to the device control part **35**, which then outputs a control signal indicating the camera preparation mode to the camera **11**, medium recording/playback part **12**, still image recording/playback part **22**, monitor display control part **33**, and switch **17**. As a result, the camera **11** converts the optical data obtained from the objective lens **2** into image data and outputs the data to the medium recording/playback part **12**, switch **17**, and still image

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recording/playback part **22**. In some cases, other control signals (e.g., changing the vision field of objective lens **2**, exposure change, etc.) may be outputted to the camera **11** from the device control part **35**. By pressing the still image button (not shown in the figure) of the operational part **36**, the device is set to the camera mode (recording mode), and the medium recording/playback part **12** records the image data to the recording medium as motion image.

The switch **17** is appropriately switched by the control signal so that the output from the camera **11** can be inputted to the monitor display control part **33**. In this camera preparation mode or camera mode, the monitor display control part **33** displays the inputted image signal to the upper side of the LCD screen **4a** of the monitor **4** as shown in Fig. 1. Also, the operational state data of the recording/playback device is converted into a display signal outputted by the display signal generation part **34** and is displayed at the lower side of the LCD screen **4a**. Therefore, when the device is in the camera preparation or camera mode, the device control part **35** displays the camera image in the upper section and device-operational data in the lower section of the LCD screen **4a** of the monitor **4**.

During the camera preparation mode or camera mode, the still image recording/playback part **22** records the image signal obtained from the camera **11** as frame-by-frame still images using the control signal outputted from the device control part **35** when the user

operates the operational part **36**. Figure 6 is a diagram showing a display example of monitor screen. In the figure, item **61** designates the area showing the still image data. When a still image button (not shown in the figure) in the operational part **36** is pressed, still image data including the frame number (displayed at the left shoulder part) and confirmation item **63** placed at the center of the monitor are displayed. By pressing the still image button of the /19 operational part **36** again, the still image recording/playback part **22** records the still image data **62**. By repeating this process, multiple still image data can be recorded. If the motion button is operated by the right hand, by designing the location of the still image button to allow left hand operation, the user can easily discriminate the operational buttons.

Furthermore, while recording or playing back the image and verifying the signal sent from the camera **11** using the monitor **4**, recording/playback part **22** records the image signal (image data of continuous motion image taken by the camera) as frame-based still images using the control signal outputted from the device control part **35** when a user operates the operation part **36**. Simultaneously, medium recording/playback part **12** continuously records the image signal (image data of continuous motion image) sent from the camera **11** onto the recording medium as motion image data. Furthermore, the image signal sent from the camera **11** is displayed as the regular image data (motion image) **61** on the monitor **4**, while still image

recorded by the still image recording/playback part **22** is displayed as a still image **62** (see Fig. 6). In this case, the device may be designed to produce the first frame of still image when the button is pressed to start recording the motion image, as such configuration eliminates an extra button when creating a still image. This can eliminate the operation of two buttons for discriminating still image and motion image. At this time, the confirmation item **63** shown in Fig. 6 is not displayed. The timing of intermittently recording still images using the still image recording/playback part **22** is set using the operation part **36** and controlled by the device control part **35**. For example, the intermittent recording timing can be changed for recording the golf club swing form and for recording the skiing form. Simultaneous to the operation of still image recording playback part **22** which intermittently records still images, the still image data sent from the still image recording/playback part **22** is /20 sent to the monitor display control part **33** and displayed on the monitor **4** as multi-images **72** (see Fig. 7). At this time, the device may be operated in such way that the control signal sent from the device control part **35** corresponding to the procedure of the operation part **36** can control the monitor display control part **33**, allowing the display of multi-images **72** instead of displaying the regular motion image **71**.

Next, once the user handles the operation part **36** in order to set the medium recording/playback part **12** in the playback mode, the

operational data sent from the operational part **36** is inputted to the device control part **35** which then outputs a control signal (designating the camera preparation mode) to the camera **11**, medium recording/playback part **12**, still image recording/playback part **22**, monitor display control part **33**, and switch **17**. As a result, the operation of the camera **11** is terminated. The medium recording/playback part **12** reproduces the image data of the motion image recorded onto the recording medium and outputs the results to the switch **17**. The switch **17** is switched by the control signal sent from the device control part **35** so that the output from the medium recording/playback part **12** is inputted to the monitor display control part **33**. During the reproduction mode, the device control part **35** controls the monitor display control part **33** to stop receiving the display signal sent from the display signal generation part **34**. As a result, the monitor display control part **33** displays the inputted image signal on the entire screen of the LCD screen **4a** (see Fig. 4). In this case, the monitor display control part **33** elongates the image data and rotates the image using the control signal obtained from the operational part **36** so that the longitudinal side of the LCD screen **4a** can be the upper or lower end of the reproduction image. Therefore, since the reproduction image can be displayed by maximally utilizing the LCD screen **4a** of the monitor part **4**, a wider screen can be obtained, hence setting the screen to be viewed by many viewers. /21

In this case, as the monitor can be placed on a table in such a way that the side surface of the device body, opposite from the monitor-attached side, can be the bottom surface, the recording/playback device can be stably positioned.

During the reproduction mode, a user can manipulate the operational part **36** to set the reproduction mode for the still image recording/playback part **22**. The still image recording/playback part **22** reproduces the still image data recorded on the recording medium and outputs the result to the monitor display control part **33**. By controlling the monitor display control part **33** using the control signal sent from the device control part **35** corresponding to the operation of the operational part **36**, only the still image **62** can be displayed on the LCD screen **4a** on the monitor **4** (see Fig. 4).

By operating the operational part **36**, the device control part **35** can display the motion image outputted from the medium recording/playback part **12** and still image data outputted from the still image recording/playback part **22** (see Fig. 6). Note that the confirmation item **63** is not displayed in this mode.

By controlling the monitor display control part **33** using the control signal transmitted from the device control part **35** corresponding to the operation of the operational part **36**, the outputted still image data of the still image recording/playback part **22** can be displayed as a multi-image screen **72** during the reproduction mode as shown in Fig. 7. In this case, regular motion

image **71** is not displayed, as only the multi-image screen is displayed.

When motion image data displayed on the monitor is checked during the reproduction mode of the medium recording/reproduction part **12** described above, the image signal used as the motion image data (reproduced output of the medium recording/playing part **12**) is intermittently recorded by the still image recording/playback part **22** to form still image frames using the control signal transmitted from the device control part **35** corresponding to the operation of the operational part **36**. Then, as shown in Fig. 7, motion image output **71** of the medium recording/playback part **12** and still image data output **72** of the still image recording/playback part **22** can be simultaneously displayed on the monitor **4**. /22

In the example described above, by forming a still image recording/playback part **22**, when optical data is recorded by the medium recording/playback part **12** as motion image data, the still image recording/playback part **22** can records/reproduces the still image data selected from the motion image data as frame images and effectively verified on the monitor part **4**.

Also, by forming a still image recording/playback part **22** in this example, when reproducing the motion image data recorded in the medium recording/reproduction part **12**, the still image recording/playback part **22** can record and reproduce the motion image

data as selected still image data that can be effectively verified on the monitor **4**.

Furthermore, by forming a still image recording and playback part **22** in this example, it, **22**, can select the motion image data, which is being recorded or going to be recorded by the medium recording/reproduction part **12**, according to the desired timing. Therefore, multiple images can be simultaneously displayed on one screen of the monitor **4** to effectively verify the images.

Moreover, in this example, when the motion image data, which is being recorded or going to be recorded by the medium recording/reproduction part **12**, is selected and intermittently recorded/reproduced as multiple still image data by forming a still image recording/playback part **22**, such intermittent interval can be modified according to the content of motion image data, thereby allowing multiple images to be displayed on one display screen of the monitor **4** for effective verification.

A tape is used as the recording medium of the medium recording/playback part (main recording/playback means) in each example, and a semiconductor memory is used as the recording medium of the still image recording/playback part (secondary recording/playback means). However, the method based on this invention does not limit to those devices. For example, semiconductor memory, optical disk, and magnetic disk may be used as the recording medium of the main recording/playback means. Also,

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tape, optical disk, and magnetic disk may be used in the place of secondary recording/playback means.

[Effectiveness of this Invention]

As described above, with the method based on this invention, the recording/reproducing motion image data (or motion image and still image data) and device operation data of the recording/playback device are separately and independently displayed by dividing the display screen such as LCD monitor mountable to a compact device body. Therefore, the image and device data can be easily observed. In addition, if necessary, the playback image can be displayed on the entire display screen to allow easy viewing when a group of many people simultaneously view the image.

In addition, with the method based on this invention, when the optical data is being recorded or going to be recorded as a motion image using a main recording/playback means, secondary recording/playback means is used to record/reproduce one or more still image frames selected from the motion image, allowing the displayed image on the display means to be verified.

Moreover, when reproducing the motion image recorded by the main recording/playback means, one or more still image data selected from motion image data is recorded/reproduced using secondary recording/playback means, so that the still image data can be verified on the display image of display means.

Keys in the figures:

1...Device body; 2...Objective lens; 3...Viewfinder; 4...Monitor; 4a...LCD screen; 4b...Capturing image data; 4c...Various operational data for recording/playback device; 11...Camera; 12...Medium recording playback part; 13, 23, 33...Monitor display control part; 14, 23, 34...Display signal generation part; 15, 25, 35...Device control part; 16, 26, 36...Operational part; 17...Switch; 22...Still image recording/playback part; 61...Area displaying the regular image data (motion image) from camera; 62...Still image displayed area; 63...Verification item at the center of monitor image; 71...Regular motion image; 72...Multi-image; 81...Motion image viewed from camera; 82...Character title/figure pattern; 101...Device body; 102...Objective lens; 103...View finder; 104...Monitor; 104a...LCD

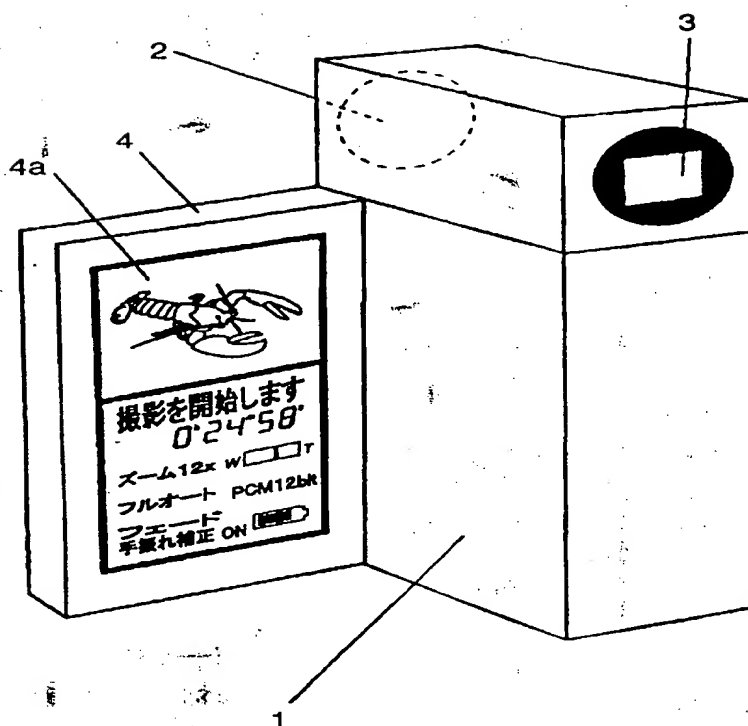


FIG. 1

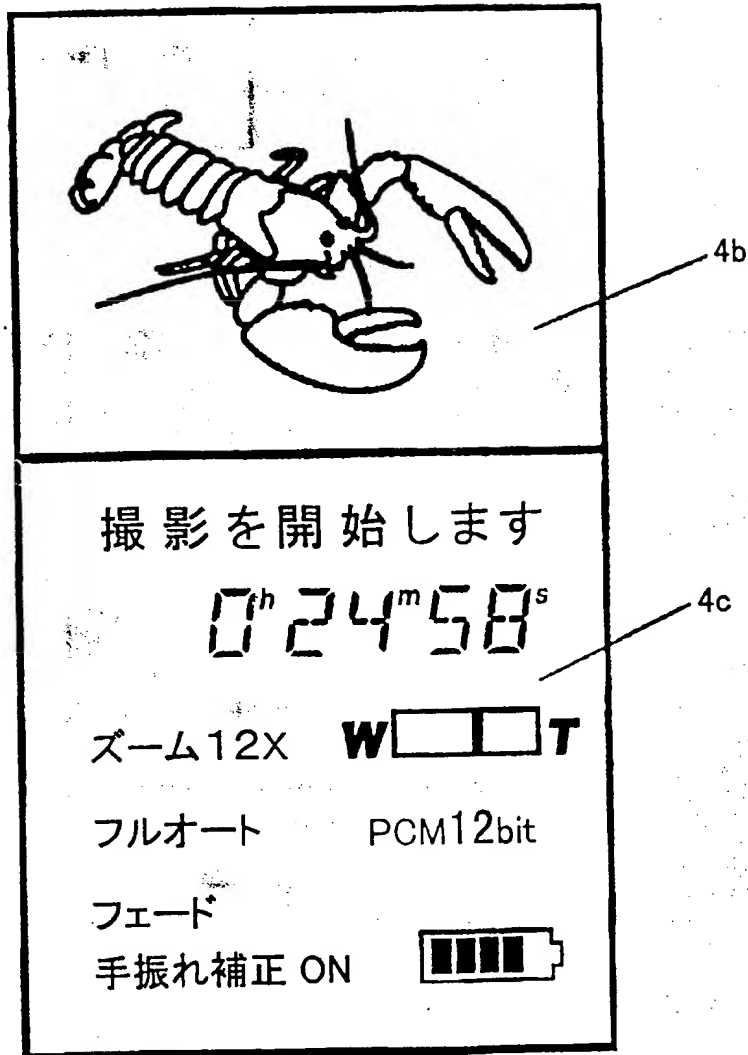


FIG. 2

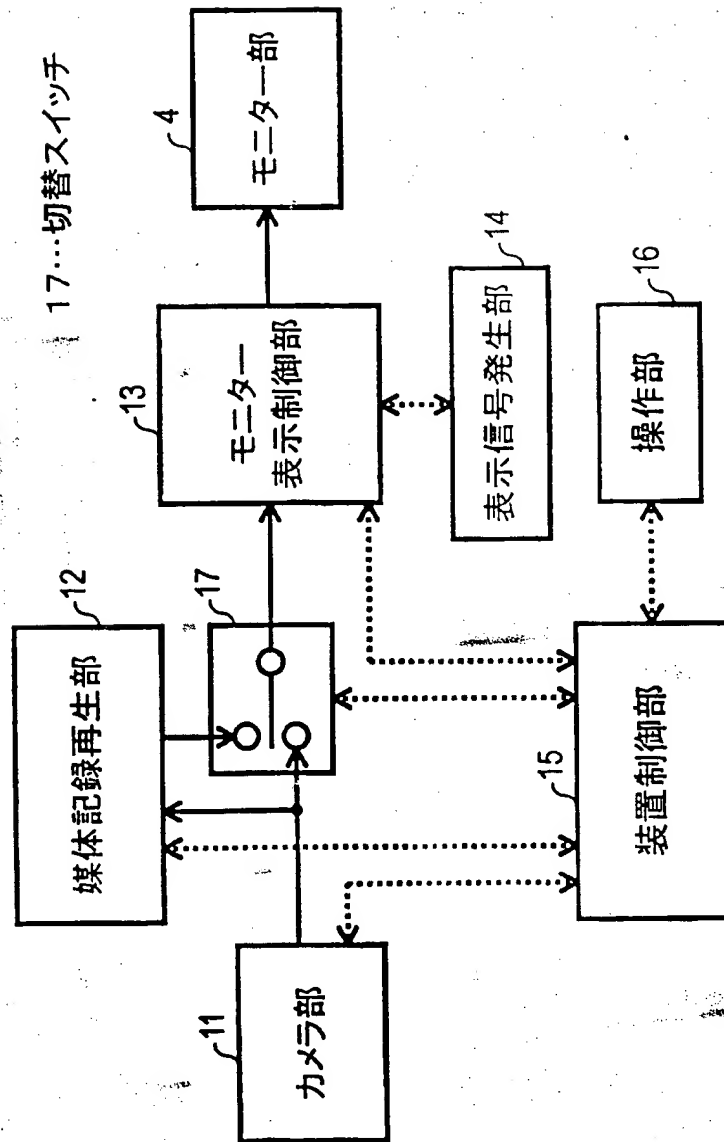


FIG. 3

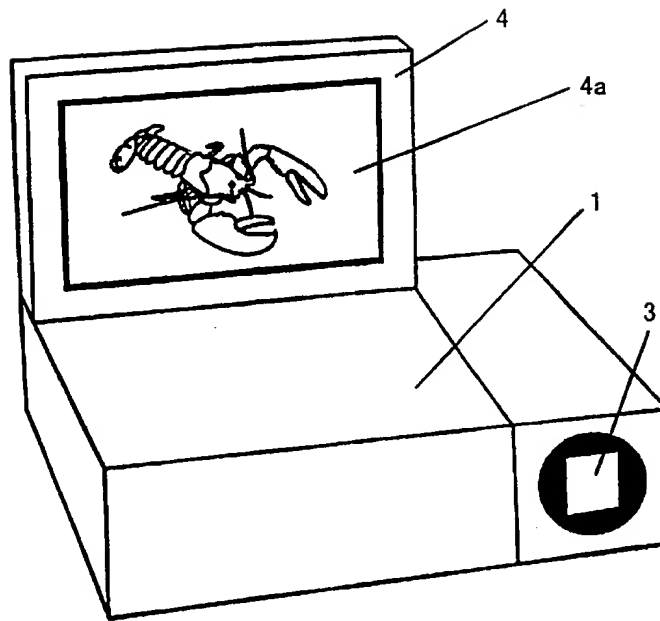


FIG. 4

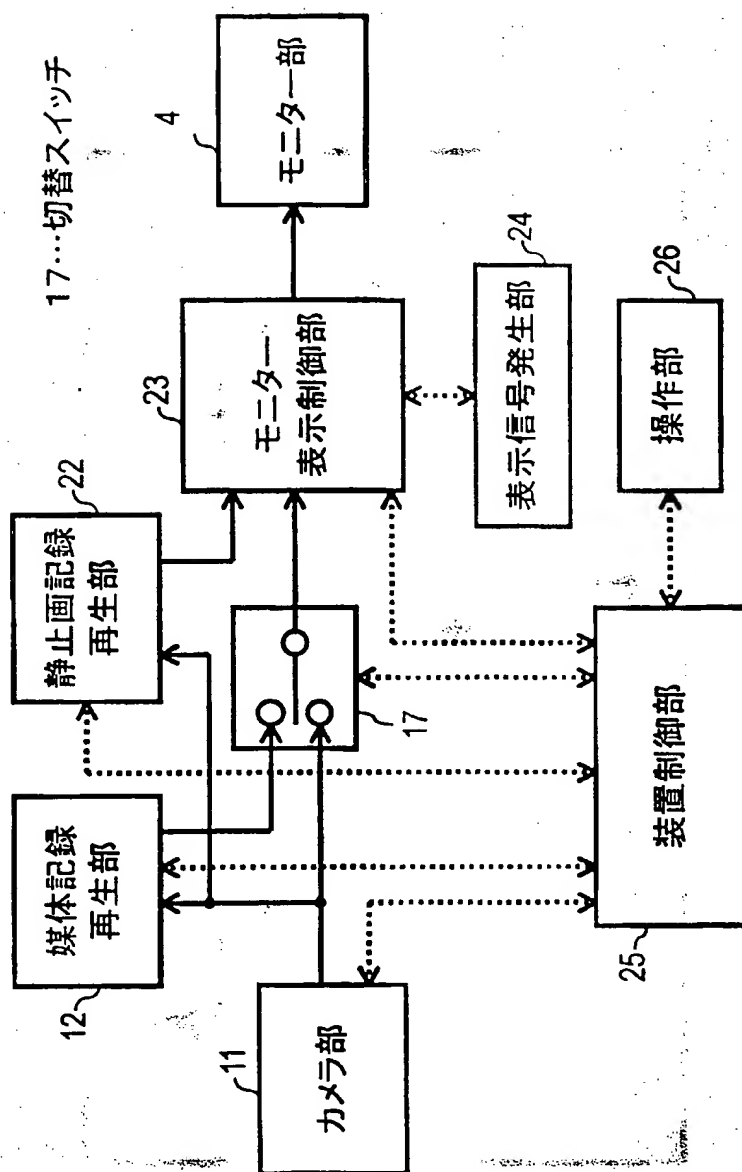
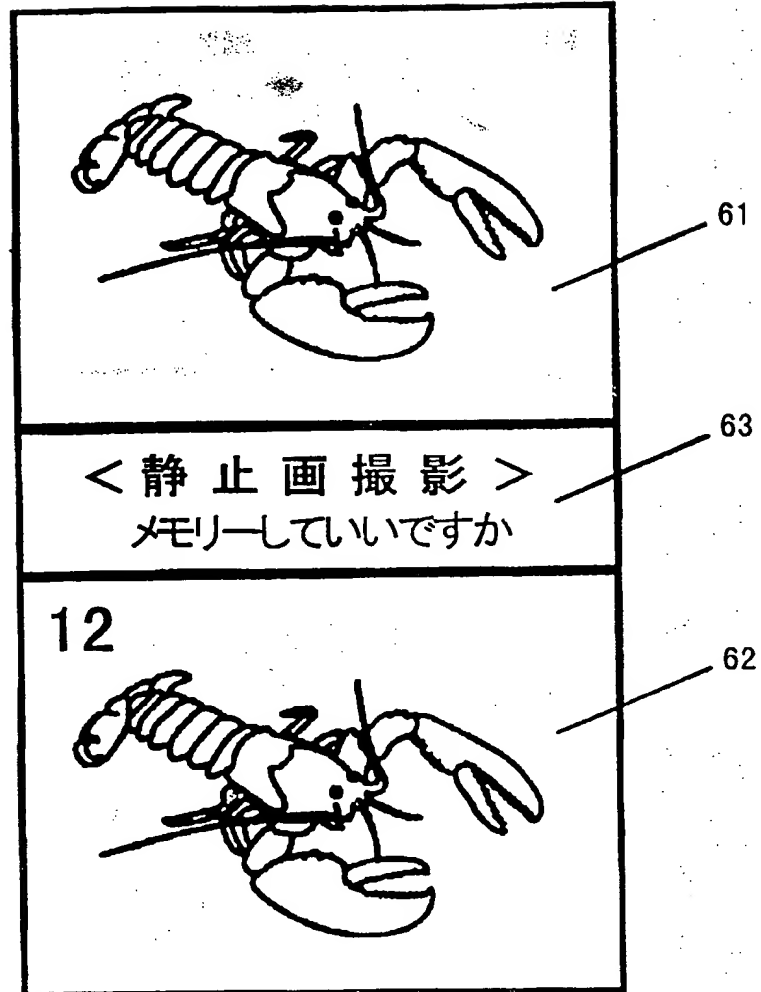


FIG. 5



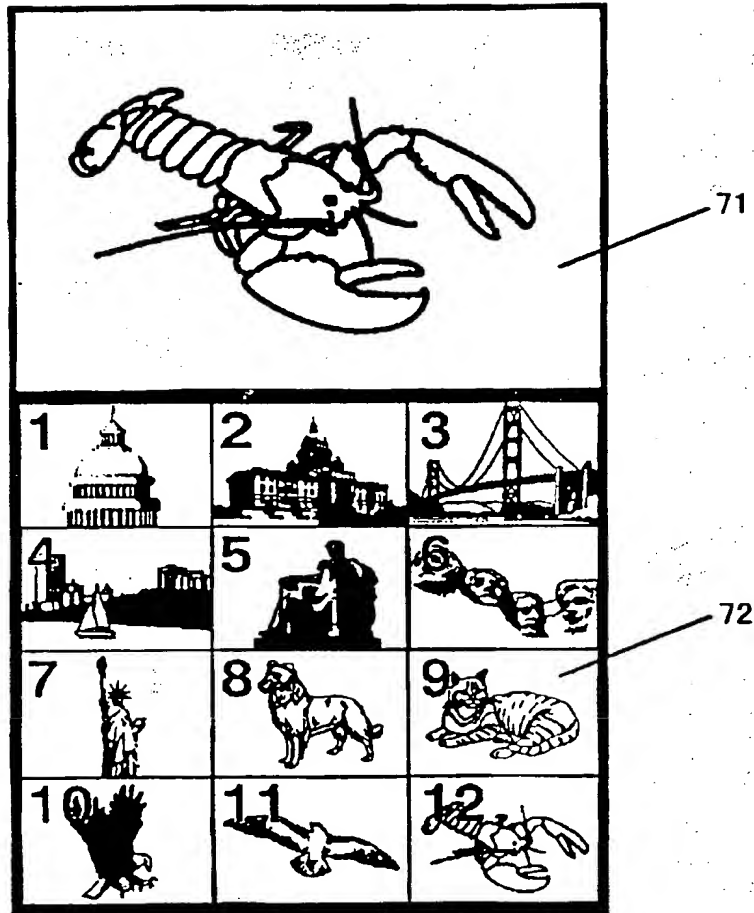


FIG. 7

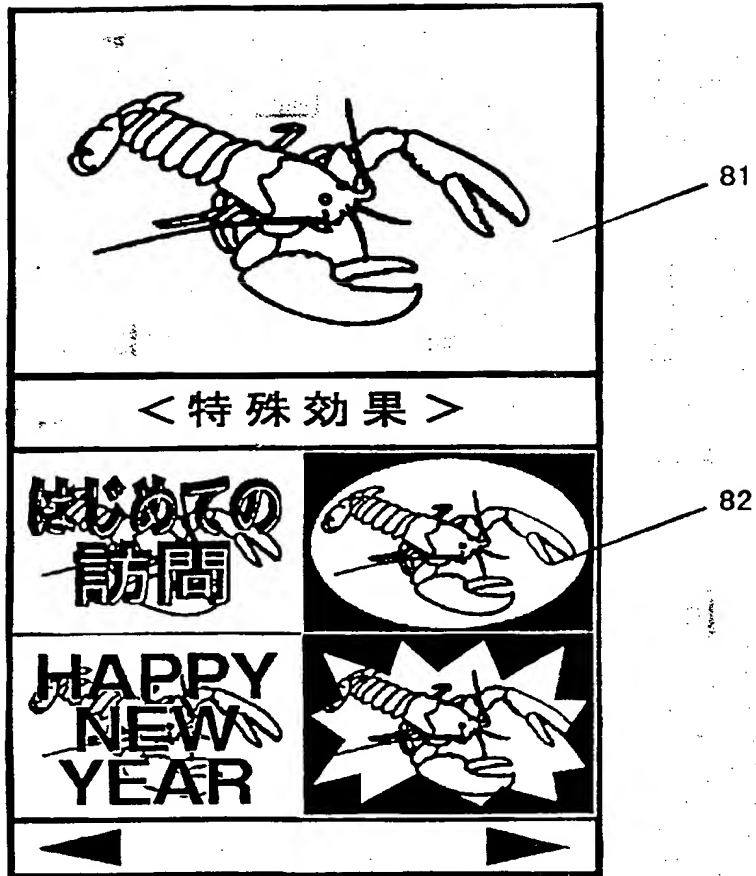


FIG. 8

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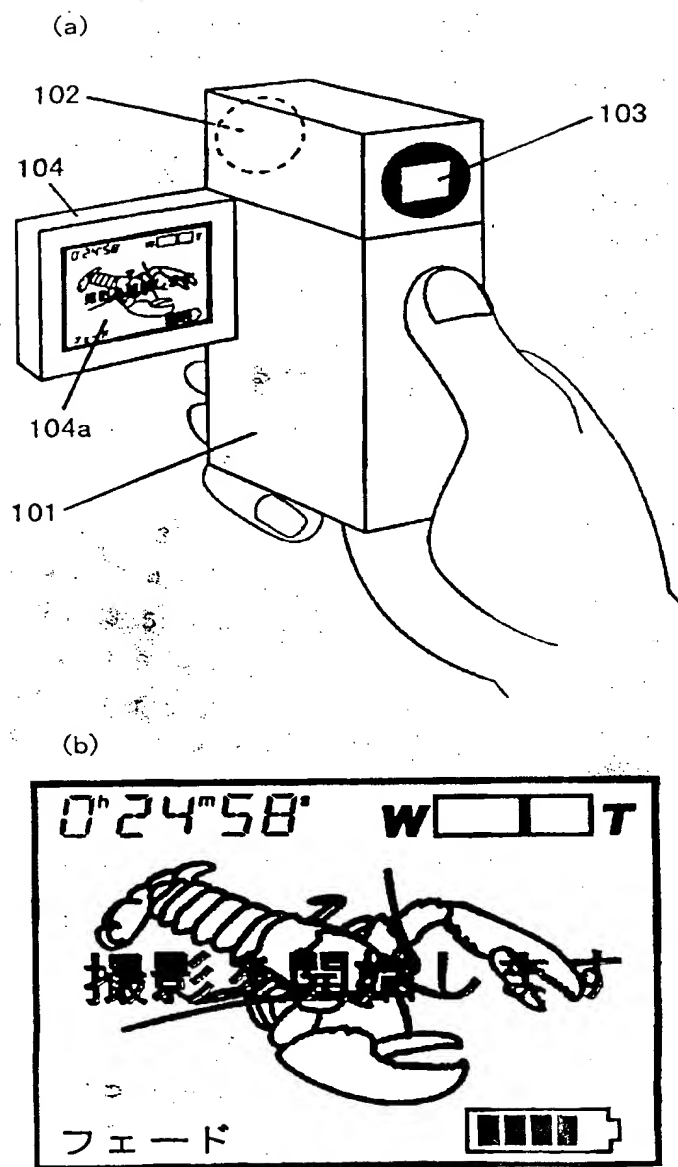


FIG. 10